

CAMI
AEROSPACE HUMAN FACTORS RESEARCH DIVISION
PERFORMANCE WORK STATEMENT
FOR
HUMAN FACTORS RESEARCH SUPPORT SERVICES

1.0 BACKGROUND

The Aerospace Human Factors Research Division (AAM-500) is located at the Civil Aerospace Medical Institute (CAMI), Mike Monroney Aeronautical Center. AAM-500 conducts research that focuses on improving individual and system performance, efficiency, and safety. The Flight Deck Human Factors Research Laboratory (AAM-510) investigates causal factors associated with aviation accidents and issues involving the design, operation, and maintenance of flight deck equipment in the NAS. The NAS Human Factors Safety Research Laboratory (AAM-520) conducts an integrated program of research on the relationship of factors concerning individuals, work groups, and organizations as employees perform their jobs. Their research is focused on improved person-job fit through selection, training, and changes to technology. The labs conduct some studies using research simulators that allow them to present experimental scenarios to pilots and air traffic controllers to assess their workload, performance, situation awareness, etc, under controlled conditions. Furthermore, research is sometimes conducted at operational worksites, with the focus being on field studies and observations. The Aerospace Human Factors Research Division contributes to the mission of the Civil Aerospace Medical Institute, which includes aerospace safety, certification, education, aeromedical and human factors research, occupational and health services.

2.0 REQUIREMENT OBJECTIVE:

To acquire research services to assist the Aerospace Human Factors Research Division with technical and subject matter support necessary to complete milestones on assigned research tasks.

3.0 SCOPE OF REQUIREMENTS:

CAMI Aerospace Human Factors Research Division requires support services to assist in research. The anticipated tasks will be associated with conditions of the FAA ATC facilities and personnel. Therefore knowledge of ATC operational procedures, roles and responsibilities of ATC operational personnel, and ATC standard phraseology, and knowledge of Aviation Industries critical events (e.g., Operational Error, Deviation, Aircraft Accidents, and Runway Incursions) is required. The support includes database development and maintenance; software development and maintenance; administration, and analysis of surveys; administration of tests; and support and analysis of laboratory and field experiments including data analysis. Additional support includes providing subject matter expertise, as needed, in aviation-related occupations. A Program Manager shall be designated to manage and supervise of all contract personnel (including subject matter experts) who are assigned to complete tasks issued within the scope of the requirements. The research will require ability to perform and interpret statistical analyses (e.g., Correlations, t-tests, Analysis of Variance, Reliability and Factor Analysis), knowledge of statistical software, and expertise in Microsoft Window's application software (e.g., Word, Access, Excel, and PowerPoint) is required.

3.1 PROJECTED TASKS

The list below identifies the historical tasked services that support AAM-500 Research Division, and projects that are conducted by AAM-500 government personnel. Not all research will be conducted by contract support. New tasks may generate within the scope of the AAM-500 Human Factors Research Division, and may require a level of support similar to the labor categories and qualifications described herein. Any changes in labor (not specified in this statement of work) must be negotiated between the CO and Contractor and incorporated by Contract Modification.

Air Traffic Human Factors project support:

- ☐ Data base creation and maintenance
- ☐ Software development, testing
- ☐ Survey construction, distribution, data collection, analysis
- ☐ Data processing and statistical analyses
- ☐ Support of laboratory experiments
- ☐ Support of field studies
- ☐ Equipment calibration
- ☐ Subject-matter expert support (air traffic controllers)

FY11 research projects:

- ☐ Longitudinal validation of ATC selection instruments
- ☐ Evaluation of ATCS biographical data and interview selection procedures
- ☐ Concurrent validation of AT-SAT for placement (CoVATCH)
- ☐ Develop new practical color vision tests for ATCS applicants
- ☐ Tower external visual requirements
- ☐ Development of methods to assess applicant temperament and emotional stability
- ☐ Dynamic Comprehension: Time on position and mental fatigue
- ☐ Strategic Job Analysis: Selecting the controller of the future
- ☐ Safety risk assessment analysis
- ☐ Development and support of HF ConOps
- ☐ Selection research for Technical Operations personnel
- ☐ Update the ATSS job task analysis
- ☐ OCC Roadmap to 2014
- ☐ Evaluate Utility of the Air Traffic Front Line Manager Quick Reference Guides

Flight Deck Human Factors project support:

- ☐ Support in creating templates that will be used as data collection forms
- ☐ Database creation, maintenance, and statistical analyses
- ☐ Conducting research literature reviews
- ☐ Electronic Primary and Multi-function Flight Displays for GA; Certification criteria and usability assessments
- ☐ Weather Displays
- ☐ General Aviation Simulation Research
- ☐ Human Factors Research Requirements for Unmanned Aerial Vehicles/Unmanned Aircraft
- ☐ General aviation accidents: Causes and Remediation
- ☐ The effects of manipulations of access to and instruction concerning the use of cockpit display of weather information on collaborative decision-making
- ☐ Expanded Shiftwork and Fatigue Assessment for Aircraft Maintenance
- ☐ Usability of Color-Coded Light-emitting Diodes (LEDs) by Pilots with Color Vision Waivers
- ☐ Effective Intensity of Flashing LED Lights

- ☐ Monitoring Pilot and Designee Perceptions of FAA Aerospace Medical Services
- ☐ Communications between pilots and controllers and system performance research
- ☐ Flight Deck Human Factors Projects
- ☐ Synthetic Vision for Primary Flight and Multifunction Displays
- ☐ Very Light Jet (VLJ) Single-Pilot Workload Assessment
- ☐ Assessment of Flight Attendant Fatigue
- ☐ Provide subjects and pay them for participating in studies conducted by AAM-500

4.0 DEFINITIONS

- ☐ Contracting Officer (CO) - Authorized Government official responsible for contract revisions, and funds obligation.
- ☐ Contracting Officers' Technical Representative (COTR) - Delegated representative for the Contracting Officer by designation.
- ☐ Full Time Equivalent (FTE) - The number of labor hours projected for a person during each year.
- ☐ Subject Matter Experts (SME): Candidates who have extensive expertise in a particular subject area and experience providing advice on the development of materials/scenarios to support research projects.

5.0 GOVERNMENT RESPONSIBILITIES (IAW 3.13-10)

AAM-500 shall provide the necessary office space, office furniture, and supplies necessary to accomplish the requirements named herein. The Government, at their discretion, may provide to the assigned support personnel training required for the performance of the task designated by Delivery Order. Any training designated by the government shall be provided at no cost to the Contractor

6.0 PERIOD OF PERFORMANCE:

The Contract services are anticipated for a period of five (5) years, consisting of the base year and four (4) one-year options, if exercised. The period of performance required for each task will be identified in the Task Performance Work Statement (TPWS) and shall be agreed upon by negotiation prior to issuance of the Delivery Order.

7.0 PLACE OF PERFORMANCE:

Services will be performed at the Civil Aerospace Medical Institute in the offices of the Aerospace Human Factors Research Division (AAM-500), 6500 South MacArthur Blvd., Oklahoma City, Oklahoma, 73069. Travel may be required to alternate sites.

8.0 WORK HOURS

The 8-hour day will normally begin no earlier than 6:00 A.M. and end no later than 6:00 P.M. Non-routine work hours and off-site travel may be required for research study data collection support or to attend specialized meetings and is subject to prior approval and authorization.

Adverse weather conditions or other emergencies may require the closure of the FAA Aeronautical Center CAMI. In most cases, no activity is expected under this contract during periods of CAMI closure and/or early dismissal, nor will any such activity be permitted during

these periods without prior authorization from the CO, or the COTR (IAW contract Section F.1 Place of Performance)

8.1 OBSERVANCE OF FEDERAL HOLIDAYS

No activity is anticipated under this contract on holidays recognized by the FAA. In the event such activity is required, the contractor will be notified by the CO, or the COTR, and will be provided as much advance notice of the requirement as practicable. Absent such requirements, holiday activities will not be permitted without prior authorization from the CO, or the COTR. A list of the designated U.S. Federal holidays as of the date of this document is as follows:

New Year's Day
Martin Luther King, Jr. Birthday
President's Day
Memorial Day
Independence Day
Labor Day
Columbus Day
Veterans Day
Thanksgiving Day
Christmas Day

9.0 PERFORMANCE REQUIREMENTS

Requirements for performance will be issued via delivery order. When requirements generate within the scope of this PWS the FAA CAMI Contracting Officer or designated Contracting Officer's Technical Representative (COTR) will coordinate the tasks with the designated Program Manager. The Program Manager will review the Task Performance Work Statement (TPWS) and submit the proposed approach to performance, schedule, and assignment of labor and related estimate (if applicable) based upon established contract labor rates. The response shall be submitted to the FAA COTR within three days. The proposed approach to tasked requirements is subject to discussion and mutual agreement between the CO or Designated Representative and the Contract Program Manager. ***The FAA reserves the right to review qualifications for each labor category and/or SME proposed for assignment to specific tasks, and agree that the proposed SME meets the qualifications described herein. Upon mutual agreement of the task order, FAA concurrence shall be acknowledged by agreement and performance authorized by funding of the delivery order.***

Any FAA regulations or guidance specific designated for AAM-500 operations shall be identified in the task requirement and made accessible to the Contractor for performance. These specific requirements may include policy, procedure, or familiarization with established databases, survey and research protocol, or customized computer software.

It is essential to the Government that services currently being performed are continued without interruption, and at the conclusion of any performance period, including option periods or extensions, the services provided under this contract may be concluded. It is imperative that transition of phase in or phase out be accomplished in a well-planned, orderly and efficient manner

9.1 PROGRAM MANAGEMENT

The Program Manager shall be responsible for supervision of all contract employees assigned to the Tasked requirements, performs the duties of a Research Assistant, and other administration associated with the tasked research support. The Program Manager shall be provided adequate work space on-site (CAMI) for supervision, and performance of the tasks. Program Manager shall:

- ☐ Implement all tasks including Phase-in Plan, and all Phase Out activities as defined.
- ☐ ensure compliance with AAM-500 task objectives identified in the TPWS
- ☐ ensure compliance with the contract provisions
- ☐ monitor performance
- ☐ coordinate with the FAA and provide written reports/documentation
- ☐ implement the quality control plan to ensure accuracy and completeness of tasked services.
- ☐ ensure deliverables and reports are received as scheduled

The FAA CO or designated COTR shall notify the contractor in writing any time the contract services fail to meet the specified requirements of the contract, delivery order or PWS. The Program Manager shall implement corrective action when deficiencies are cited by the government and summarize in the monthly status reports.

9.2 PROJECTED LABOR CATEGORIES

It is expected that the contract services will have knowledge of FAA ATC facilities, how they operate, types of personnel, roles and responsibilities of ATC operational personnel, ATC standard phraseology, and knowledge of critical incident events (e.g., Operational Errors, Deviation, Aircraft Accidents, and Runway Incursions). The anticipated labor categories for the requirements described herein are listed below.

- ☐ Project Manager
- ☐ Industrial Psychologist
- ☐ Research Assistant
- ☐ Research Technician
- ☐ Senior Computer Programmer (IV)
- ☐ Computer Programmer II
- ☐ General Clerk III
- ☐ Subject Matter Experts (SME) Air Traffic Control
- ☐ Subject Matter Experts (SME) Pilot
- ☐ Subject Matter Experts (SME) Airframe and Power Plant (A&P)III

9.3. TRAVEL

Travel may be requested to FAA locations such as the William J. Hughes Technical Center (Atlantic City, NJ), FAA Headquarters (Washington, DC), NASA (primarily NASA Ames Research Center, CA), and FAA field facilities (such as, but not limited to DFW, ATL, DTW, MEM).

9.4 REPORTING:

Upon completion of the task the Contractor shall submit the final report for the task. Additionally, a monthly report shall be submitted with each invoice. Invoicing procedures are

defined in the contract. The monthly report shall include status for all tasks in progress, identify hours incurred, associated labor, cost of hourly labor incurred, FAA security requirements (as applicable), any travel expenses authorized and incurred (if any) during the month, problem areas, deficiencies and the associated resolution. The report shall also identify the projected labor and cost to complete the task and obligated funds available on the order. The FAA CO or COTR will review the report/and or required deliverables for compliance with the contract for acceptance. Correction to the report or verification of hours incurred may be required prior to acceptance. Acceptance shall be acknowledged by signature of the COTR on the contract invoice.

10. QUALIFICATIONS AND DUTIES FOR LABOR

10.1. Project Manager

The Project Manager will be responsible for supervision of all assigned personnel to ensure the competent and timely performance of all tasks described in this statement of work. Coordinates contract research activities with the Aerospace Human Factors Research Division's principle investigators and managers regarding particular task assignments as described in the statement of work. Directs, organizes and manages the work activities of all contract personnel to ensure the accuracy and timely completion all tasks. Establishes, maintains and manages a quality assurance program to ensure the accuracy and completeness of all task products. The Project Manager will provide reports and summaries of contract progress for all assignments to the CO or designated Contracting Officer's Technical Representative (COTR). The Program manager must have experience managing the production of research (databases, reports, surveys, and other research tools) for concurrent research projects. The Project Manager may also perform research. Approximately 55% of the Project Managers' time will be spent doing research.

Education Requirements: Requires a master's degree or equivalent experience in a behavioral science discipline.

Required Experience:

- ☐ Experience in conducting research using subject matter experts to produce databases, reports and other research tools as required by the research objective.
- ☐ Experience using and HFACS to categorize errors in human performance leading to ATC operational errors and aviation accidents are preferred.
- ☐ Experience performing mid to high level tasks associated with survey research (e.g., instrument design survey distribution, database management, report design, technical reports and data analyses) is required.
- ☐ Experience working on mid to large-scale surveys (3,000 - 50,000 respondents) is required. Experience performing rapid to high level tasks associated with human factors research (e.g., experimental design, conducting experiments, traveling to collect data., interviewing participants, developing experimental protocols, database management, report design, technical reports and data analyses) is required.

- ❑ Experience using human factors taxonomies to categorize human performance is required. Expertise in Microsoft Window's application software (e.g., Word, Access, Excel) and SPSS is required. Experience using Reference Manager software.

10.2 Research Assistant

The Research Assistant will write, execute, and modify SPSS programs for statistical analyses of human factors experiments and survey research. Writes, edit, and proofread technical reports, journal articles and presentations. The Research Assistant creates data and summary reports using inferential and descriptive statistics, creates and edits survey content, develops coding systems for qualitative data, prepares charts, graphs, and diagrams to support statistical analyses, develops data collection protocols for survey and experimental research projects, develops procedures for distributing, surveys/tests, and administering experiments, organizes data collection procedures, designs and formats surveys using word processing and survey software and conducts reviews of the behavioral science research literature.

Education Requirements: Requires a master's degree or equivalent experience in a behavioral science discipline.

Required Experience:

- ❑ Performing mid to high level tasks associated with survey research (e.g., instrument design, survey distribution, database management, report design, technical reports and data analyses), and experience working on mid to large-scale surveys (3,000 - 50,000 respondents) is required.
- ❑ Experience performing mid to high level tasks associated with human factors research (e.g., experimental design, conducting experiments, traveling to collect data, interviewing^g participants, developing experimental protocols, database management, report design, technical reports and data analyses) is required.
- ❑ Experience using human factors taxonomies to cate^gorize human performance is required.
- ❑ Expertise in Microsoft Window's application software (e.g., Word, Access, Excel, and PowerPoint) and SPSS is required. Requires a master's degree or equivalent experience in a behavioral science discipline.

10.3 Industrial Research Psychologist

The Research Psychologist will conduct applied research related to aviation or air traffic control and conduct strategic job analysis.

Education Requirements: PHD in General Experimental, cognitive, quantitative, Industrial/Organizational (I/O), social, educational, applied psychology or Human factors psychology/engineering.

- ❑ Experience Requirements: Knowledge of theory and methods used to conduct research in general experimental, cognitive, quantitative, industrial/organizational (i/o), social, educational, or applied psychology, or human factors psychology/engineering.
- ❑ Experience in conducting, independently, at least one research project related to applied psychology or human factors psychology/ engineering.
- ❑ Experience conducting research using job analysis methodology.
- ❑ Minimum of one year of experience working in a public or private setting conducting research related to applied psychology or human factors psychology/engineering.

10.4. Senior Computer Programmer

Develops and codes computer subroutines, ranging in nature from simple to complex, and integrates subroutines written in different languages into a complex program. Writes computer programs to build large data files and extracts data from existing magnetic tape or disk files for research purposes. Writes general purpose and scientific programs using machine level or higher level programming languages and software associated with currently installed computer hardware for a Windows XP/Windows 7 network. The Computer Programmer will be responsible for insuring that software programming is completely reliable and compatible with existing software and hardware, designs data collection, extraction, and analysis tools for human factors research projects.

Education Required: Bachelors Degree in Computer Science, or a Bachelors Degree in mathematics or one of the physical sciences with a minor in Computer Science.

Required Experience:

- ❑ Experience in Microsoft Window's application software (e.g., Word, Access, Excel, and PowerPoint) and SPSS (or SAS) is required. Experience in Microsoft FrontPage or other web development tools/software is required. Experience programming in Windows XP and Linux).
- ❑ Experience and knowledge of structured programming and techniques for scientific programming, interaction of hardware/software, data management systems, graphics and statistical analysis software, and with programming languages (C, C++, Visual C++.net, Visual Basic.net, and Visual Studio 2008) is required.

- ❑ Experience managing complex and dynamic relational databases (e.g., maintaining, updating merging, data verification and extracting of data).
- ❑ VB.NET: 5 years experience, MS SQL Server: 5 years experience, ASP.NET: 5 years experience, Visual Studio.net: 5 years experience, experience developing, testing, and deploying a web based application, experience with MS SQL Server reporting services.

10.5 Computer Programmer

Develops and codes computer subroutines, ranging in nature from simple to complex, and integrates subroutines written in different languages into a complex program. Writes computer programs to build large data files and extracts data from existing magnetic tape or disk files for research purposes. Writes general purpose and scientific programs using machine level or higher level programming languages and software associated with currently installed computer hardware for a Windows XP/Windows 7 network. The Computer Programmer will be responsible for insuring that software programming is completely reliable and compatible with existing software and hardware, designs data collection, extraction, and analysis tools for human factors research projects.

Education Required: Bachelors Degree in Computer Science, or a Bachelors Degree in mathematics or one of the physical sciences with a minor in Computer Science.

Required Experience:

- ❑ Experience in Microsoft Window's application software (e.g., Word, Access, Excel, and PowerPoint) and SPSS (or SAS) is required. Experience in Microsoft FrontPage or other web development tools/software is required. Experience programming in Windows XP).
- ❑ Experience and knowledge of structured programming and techniques for scientific programming, interaction of hardware/software, data management systems, graphics and statistical analysis software, and with programming languages (C, C++, Visual C++, Visual Basic.net, and Visual Studio 2008) is required.

10.6 Research Technician

The Research technician will write, execute, and modify SPSS syntax: or other automated programs for data cleaning; writes SPSS syntax to format data files; creates and checks charts, graphs, and diagrams to support statistical analyses; ensures the accuracy and completeness of research data. This will include coordinating data collection with subject matter experts, Coding qualitative data, documenting data collection and data verification procedures, administering experimental protocol, performing data collection procedures, verifying information on survey and experimental results, typing and proofing documents and materials. The Research Technician may perform other survey/testing duties as required assisting in the research efforts of the Human Resource Research Division

Education Requirements: Requires a bachelor's degree in a behavioral science discipline.

Required Experience:

- ❑ Performing mid level tasks associated with survey research (e.g., survey distribution, data collection, database management) and working on raid-scale surveys (1,000 - 3,000 respondents), and large-scale surveys.
- ❑ Experience performing mid level tasks associated with human factors research (e.g., conducting experiments, collecting data, interviewing participants, and database management).
- ❑ Experience using research taxonomies to categorize human performance is required.
- ❑ Experience in Microsoft Window's application software (e.g., Word, Access, Excel, and PowerPoint) and SPSS (or SAS) is required.

10.7 General Clerk III

The Clerk will transcribes air traffic control communications from voice, tapes, manually enter data into personal computer or minicomputer system using customize data entry programs, performs quality assurance checks on data reports, prepares surveys/tests for optical scanning, Scans surveys/tests. The clerk may prepare surveys, collect, prepare and assemble other documents purposes. The clerk may examines data records, assign entry codes, and verify data fields to identify records with missing data and obtain missing data following prescribed protocol (i.e., making phone calls, writing memos, talking to people and referring to documents or by emailing them). The contractor should always identify themselves as supporting an FAA office or program: **T3.8.2 Service Contracting. Contractor Identification.** Contractors providing support services for FAA, as defined in this Section, must identify themselves as supporting an FAA office or program when there is any reasonable question regarding their status. This identification must be in all forms of support-related communication including meetings and teleconferences, individual phone calls, and email. For example, in meetings where everyone is introducing themselves or when making or receiving calls though the FAA telephone system, such contractors must identify themselves as contract support. At meetings where there is a "sign-in" sheet or similar roster, contractors must identify themselves as contract support. Similarly, the signature block of support contractor personnel using the FAA email system (in addition to the "ctr" in the email address) must identify the individual as a support contractor. Such identification will reduce the potential for appearances of an employer-employee relationship between FAA and its contract support personnel. FAA program managers, COTRs, and contracting personnel are responsible for ensuring compliance with this requirement as part of the administration of individual support contracts. The duties include typing and proofing documents, management of incoming mail (opening and stamping date of arrival), converting, copying, filing, and shredding of documents.

Education Requirements: High School Diploma or equivalent.

Required Experience:

- ☐ Experience working with surveys, applications and forms (e.g., distribution, data collection, data entry and transcription) is required.
- ☐ Experience in Microsoft Window's application software (e.g., Word, Access, Excel, and PowerPoint) and SPSS (or SAS).

10.8 Air-Traffic Control (ATC) Subject Matter Experts (SME)

The ATC SME will Provides input for the development of research tools required to assist in the research efforts of the Aerospace Human Factors Research Division, reviews existing research and data collection products. participates in studies using various research tools, simulators and devices, codes and analyses aviation incidents, accidents and situational data, and coordinate with other subject matter experts in the field. The ATC SME will provide subject matter consultation to principle investigator. The specific knowledge, skills, and abilities required are defined by the needs of a given research program. The type of research ranges from designing and optimizing job selection, training and performance criteria to participating in human factors research studies, and the development of Air Traffic Control simulations.

Education Requirements: None

Required Experience:

- ☐ At least 10 year experience as Air Traffic controller (center or terminal), supervisor, manager, and instructor.

10.8 Pilot Subject Matter Experts (SME)

The Pilot SME provides input for the development of research tools required to assist in the research efforts of the Aerospace Human Factors Research Division, reviews existing research and data collection products, participates in studies using various research tools, simulators and devices codes and analyses aviation incidents, accidents and situational data, provides coordination with other subject matter experts in the field, provides subject matter consultation to principle investigator. The specific knowledge, skills, and abilities required are defined by the needs of a given research program. The type of research ranges from designing and optimizing job selection, training and performance criteria to participating in human factors research studies, and the development of flight simulation protocols.

Education Requirements: NONE

Required Experience:

- ☐ At least 1500 flight hours logged as a GA or commercial pilot. Various research

projects require input from experienced pilots.

10.9 A&P: Subject Matter Expert:

The A & P SME will provides input for the development of research tools required to assist in the research efforts of the Aerospace Human Factors Research Division, reviews existing research and data collection products, participate in studies using various research tools, simulators and devices, codes and analyze aviation incidents, accidents and situational data. The A & P SME will provide coordination with other subject matter experts in the field, and provide subject matter consultation to principle investigator. Various research projects require input from experienced maintenance personnel and mechanics. The specific knowledge, skills, and abilities are defined by the needs of a given research program. The type of research ranges from designing and optimizing job selection, training and performance criteria to participating in human factors research studies, and the development of flight simulation protocols.

Education Requirements: NONE

Experience Requirements: At least 10 years experience as an A&P certified mechanic.